Programming your Calculator

Has this ever happened to you? You memorize a formula that is important for the test, your teacher (who is SUPER NICE) lets you use your calculator…and you ***still*** plug the numbers in wrong! How frustrating! Today you are going to learn how to program your calculator to avoid this exact situation. Programming your calculator also eliminates the need to re-enter the same formula each time you want to perform a computation**. Once you learn how to do this, you can always enter any new formulas that you learn into your calculator to make your life easier!**

Let's start with something easy:

The formula for the area of a circle is $\mathbf{A = \pi r^2}$ (I know, I know, you KNEW that!). You will find the steps in the PRGM menu:

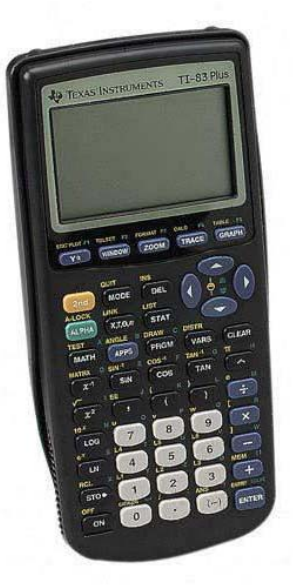
- Hit the button PRGM
- You will see three choices: EXEC, EDIT, NEW. Because we are going to create a program from scratch, arrow over to NEW.
- Choose → 1: Create New
- You will need to name your program. Notice the ALPHA key flashing? That means you are in Alpha lock mode…everything you type will be letters. Always name your program something that will make sense in the future. Name this program ***AreaCirc*** and hit ENTER.
- Below is the program you will be typing in. Next to it is the instructions on how to enter the program.

Program	Instructions
: Disp "RADIUS" : Input R : (π*R^2) → a : Disp "AREA IS" : Disp A	▪ "Disp" means ***Display***. To get there, press PRGM then arrow over to I/O (which means Input/Output) and go to ***3: Disp***. You will need to turn on your Alpha lock (2^{nd} → ALPHA) so that you can type words instead of numbers. The quotes " " are above the plus (+) sign. If you type something in quotes, the calculator will display exactly what you have in quotes. ▪ You want the user to INPUT the radius. Press PRGM then arrow over to I/O and go to ***1: Input.*** Then type R using an Alpha key. ▪ You need to tell the calculator what formula to use (π*R^2). Then, you want the calculator to store the answer to the area formula in a. "a" is just a temporary storage space that will store your answer until you give it a new value. To get it to store it in a, hit the STO▸ button just above the ON button. ▪ Once the calculator does the calculating it for you, you need it to display the answer. Remember to use quotes around "AREA IS" (and turn on your Alpha lock!). If you want a space, you can find it above zero ⌊ ⌋. ▪ Since we want the calculator to give the answer that is stored, you do not need quotes around the final a. Asking the calculator to display a means for it to show the answer that is in storage spot a.

Try it! Go to 2^{nd} → Quit.

- Hit the PRGM button.
- Since you want to EXECUTE a program, choose the EXEC menu and then the Area of a circle program.
- The calculator will display prgmAREACIRC. Press enter to execute this program.
- Type 4 in for the radius.
- The answer 50.265…. should be displayed.
- Try a few more to make sure it is working correctly.

Your turn:



To the right you will find a program for the Quadratic Formula. Try to program this into your calculator. If you get stuck, ask someone in your group to help you. Once you think your program is working, try a few problems to make sure. Then, show your completed program to your teacher.

```
:Disp "A IS"
:Input A
:Disp "B IS"
:Input B
:Disp "C IS"
:Input C
:(-B+√(B^2 - 4AC))/(2A) → E
:(-B-√(B^2 - 4AC))/(2A) → F
:Disp "ZEROS ARE"
:Disp E,F
:Stop
:End
```

Your turn to try one from scratch:

1) Make a program for the DISTANCE FORMULA. Show this to your teacher.

2) Write a program for Heron's formula. Heron's formula for the area of a triangle with sides of length a, b, and c is given by:

$$A = \sqrt{s(s-a)(s-b)(s-c)} \qquad \text{where } s = \frac{a+b+c}{2}$$

3) Decide on another formula to put in your calculator. Make sure it is different than the ones your group members choose.

Sharing your program:

Once you write a program, you can share it with your classmates. ***READ ALL OF THE DIRECTIONS BEFORE PROCEEDING!***

- Get a link cable from your teacher
- Plug the link cable into both calculators. Make sure the cable is pushed all the way into the socket.
- Go to LINK (2^{nd} → [X,T,Θ,n])
- The person sending needs to choose SEND → 3:Prgm → (Choose the program you want to send) → TRANSMIT → ENTER
- The person receiving the program needs to choose LINK (2^{nd} → [X,T,Θ,n]) → RECEIVE → ENTER.
- ***IMPORTANT***! The person sending must hit SEND BEFORE the person receiving hits RECEIVE!